CLAIMS

1. An apparatus comprising:

at least one seismic sensor; and

a plurality of sources deployed in a manner structurally independent of the or each seismic sensor and adapted to provide a positional signal for the determination of the position and depth of the or each seismic sensor, the positional signal being distinguishable from a seismic survey signal to the or each seismic sensor.

2. The apparatus of claim 1, wherein the sources are adapted to provide the positioning signal at a frequency outside the bandwidth of the seismic survey signal.

3. The apparatus of claim 2, wherein the sources are adapted to provide the positioning signal at a frequency above the bandwidth of the seismic survey signal.

4. The apparatus of claim 3, wherein the sources are adapted to provide the positioning signal having a frequency bandwidth.

5. The apparatus of claim 4, wherein the frequency bandwidth is approximately 700 Hz to 2000 Hz.

6. The apparatus of claim 4, wherein the frequency bandwidth is approximately 1500 Hz to 4500 Hz.

7. The apparatus of claim 1, wherein the plurality of sources comprises between two and five sources, inclusive.

8. The apparatus of claim 7, wherein the plurality of sources comprises three sources.

9. The apparatus of claim 1, wherein the plurality of sources are piezoelectric sources.

10. The apparatus of claim 1, further comprising a signal processing unit adapted to determine the position of the or each seismic sensor from the received positioning signal.

11. The apparatus of claim 10, wherein the signal processing unit is adapted to determine the position of the or each seismic sensor using a plurality of propagation times from the plurality of sources to the at least one seismic sensor.

12. The apparatus of claim 11, wherein the signal processing unit is adapted to determine the position of the or each seismic sensor by triangulation using the plurality of propagation times from the plurality of sources to the at least one seismic sensor.

13. An apparatus as claimed in claim 1 wherein at least one seismic sensor is deployed on a seabed.

14. The apparatus of claim 13, wherein the sources are adapted to provide the positioning signal at a frequency outside the bandwidth of the seismic survey signal.

15. The apparatus of claim 14, wherein the sources are adapted to provide the positioning signal at a frequency above the bandwidth of the seismic survey signal.

16. The apparatus of claim 15, wherein the sources are adapted to provide the positioning signal having a frequency bandwidth.

17. The apparatus of claim 16, wherein the frequency bandwidth range is approximately 700 Hz to 2000 Hz.

18. The apparatus of claim 17, wherein the frequency bandwidth range is approximately 1500 Hz to 4500 Hz.

19. A method for determining a position of at least one seismic sensor capable of receiving a seismic survey signal, comprising:

transmitting a plurality of positioning signals from a plurality of sources deployed in a manner that is structurally independent of the or each seismic sensor, the positioning signals being distinguishable from the seismic survey signal;

receiving the positioning signals at the or each seismic sensor; and

determining the position and depth of the or each seismic sensor from the received positioning signals.

20. The method of claim 19, wherein transmitting the plurality of positioning signals comprises transmitting the positioning signals at a frequency outside the bandwidth of the seismic survey signal.

21. The method of claim 20, wherein transmitting the plurality of positioning signals comprises transmitting the positioning signals at a frequency above the bandwidth of the seismic survey signal.

22. The method of claim 21, wherein transmitting the plurality of positioning signals comprises transmitting the positioning signals at a frequency between 700 Hz and 4500 Hz.

23. The method of claim 22, wherein transmitting the plurality of positioning signals comprises transmitting a plurality of sweeps from 700 Hz to 2000 Hz.

24. The method of claim 22, wherein transmitting the plurality of positioning signals comprises transmitting a plurality of sweeps from 1500 Hz to 4500 Hz.

25. The method of claim 19, wherein determining the position and depth of the or each seismic sensors using the received signals comprises determining a plurality of propagation times from the sources to the or each seismic sensor using the received signals.

26. The method of claim 25, wherein determining the position and depth of the or each seismic sensor comprises determining the position and depth of the or each seismic sensors using the plurality of propagation times.

27. The method of claim 26, wherein determining the position and depth of the or each seismic sensor using the plurality of propagation times comprises determining the position and depth of the or each sensor by triangulation using the plurality of propagation times.

28. A method as claimed in claim 19 and comprising receiving the positioning signals at a plurality of seismic sensors deployed on a sea bed.

29. The method of claim 28, wherein transmitting the plurality of positioning signals comprises transmitting the positioning signals at a frequency outside the bandwidth of the seismic survey signal.

30. The method of claim 29, wherein determining the position of the seismic sensors using the received signals comprises determining a plurality of propagation times from the sources to the seismic sensors using the received signals.

31. A system, comprising:

an apparatus as defined in one of claims 1 to 9;

a vessel;

a seismic cable having the least one seismic sensor, wherein the seismic cable is deployed from the vessel;

a plurality of buoys; and

a signal processing unit adapted to determine the position of the seismic sensors from the received positioning signals; wherein at least one source is suspended beneath the survey vessel and the remainder are deployed on the buoy.

32. The system of claim 31, wherein the buoys are autonomous self-propelled buoys.

33. The system of claim 31, wherein the buoys are towed behind the survey vessel.

34. A system, comprising:

an apparatus as defined in one of claims 1 to 9;

a vessel;

a seismic cable having the at least one seismic sensor wherein the seismic cable is deployed from the vessel;

at least one boom coupled to the vessel; and

a signal processing unit adapted to determine the position of the sensors from the received positioning signals; wherein at least one source is coupled to the vessel and the remainder are coupled to the at least one boom.

35. The system of claim 34, further comprising an array of seismic cables having at least one sensor capable of receiving the seismic survey signal.

36. A system, comprising:

an apparatus as claimed in one of claims 1 to 9; and

a plurality of autonomous self-propelled buoys;

wherein the sources are coupled to the self-propelled autonomous buoys.

37. The system of claim 36, wherein the sources are suspended beneath the autonomous self-propelled buoys.

38. The system of claim 36, further comprising a signal processing unit adapted to determine the position of the seismic sensors using the received positioning signals.

39. The system of claim 36, wherein the seismic sensors are deployed on a seismic cable coupled to the vessel.

40. A system, comprising:

an apparatus as claimed in any of claims 1 to 9;

a first vessel;

a seismic cable having the at least one seismic sensor, wherein the seismic cable is deployed from the first vessel;

a second vessel;

a plurality of buoys; and a signal processing unit adapted to determine the position of the seismic sensors from the received positioning signals; wherein at least one source is coupled to the first vessel, at least one source is coupled to the second vessel; and the remainder are deployed on the buoys.

41. The system of claim 40, wherein at least a portion of the [redacted]s are deployed along a length of the seismic cable.

42. The system of claim 40, further comprising an array of seismic cables having at least one seismic sensor capable of receiving the seismic survey signal.

43. The system of claim 42, wherein at least a portion of the buoys are deployed among the array of seismic cables.